

ABSTRACT

The development of nanocomposites has been found in various fields such as biomedicine, sensors and computing. With their small size, nanocomposites have different properties to suit the material. ZnO/PVA nanocomposites have been successfully synthesized using the in situ method in which ZnO synthesized and ZnO nanoparticles as filler and PVA as a matrix, were treated at temperature (room temperature and 80°C) and after the synthesis process (70°C, 90°C, 120°C). I-V, UV-Vis, XRD, and SEM characterizations have been carried out to determine the electrical, crystalline and optical properties of ZnO/PVA nanocomposites. Characterization of electrical properties using I-V measurements showed that ZnO_{synthesized}/PVA had a high current value of 1.55 nA while ZnO_{nano}/PVA had a smaller current value of 1.49 nA when treated at 120°C. In addition, the higher the treatment temperature, the resistance of ZnO_{synthesized}/PVA and ZnO_{nano}/PVA increased. UV-Vis characterization showed that ZnO_{nano}/PVA experienced a red shifted when the temperature increased, while ZnO_{synthesized}/PVA and ZnO_{nano}/PVA when treated at 120°C experienced a blue shifted temperature. XRD characterization of ZnO_{nano}/PVA showed that the higher the given temperature, the lower the crystallinity from 45.77-34.81%. SEM characterization showed that ZnO_{nano}/PVA at room temperature agglomerated and formed larger particles.

Keywords: ZnO/PVA nanocomposites, thin film, heat treatment, I-V, XRD, SEM, UV-Vis.